

**REMARKS**

The Examiner rejected applicants' new claims 20-38, filed in response to the previous Office Action. The Examiner made this current action FINAL. Applicants submit this RCE in response to the Examiner's FINAL rejection.

The Examiner objected to claim 36, stating that the recitation to the second device should be reformulated with reference to the first device. The invention consists of two devices, the base station and the mobile. The transmission from the fixed part to the mobile is referred to as the downlink. The transmission from the mobile to the fixed part is referred to as the uplink.

Both the first device (the fixed part) and the second device (the mobile) have an encoding means for transmission. In the mobile, the encoding means for transmission back to the fixed part (via the uplink) uses a code mode based on reformed second control information. This is how the quality measurement is signaled in the uplink. See page 6, lines 22-27 in this regard. This is why the claim recites that the data is encoded for transmission using a mode code that is based on the reformed quality information. The reformation occurs in the mobile for transmission, via the uplink, of information from the mobile to the fixed part.

The Examiner's objection is based upon the fact that the transmission means from the mobile to the base station (via the uplink) is not expressly recited. Accordingly, the applicants have amended claim 36 to expressly recite a transmission means. Support for the amendment is found on page 6, lines 1-27. Based upon this, and the clear support for the transmission means in the second device provided by the specification, the Examiner is respectfully requested to withdraw the objection to claim 36.

The Examiner rejected claims 20-38 under 35 USC § 112. The Examiner believes that new independent claim 20 (and therefore the claims dependent thereon) introduces new matter not conveyed when the original application was filed.

The Examiner specifically objects to the limitation that recites "partitioning the second type of control information into a number of sections corresponding to the number of frames in the multi-frame." The crux of the Examiner's objection is that the illustrated example shows partitioned information distributed in three frames of a six-frame multi-frame on page 4, line 23 of the specification. The Examiner seems to infer that the six-frame multi-frame is the multi-frame referred to in the claims. This is not the case. The multi-frame is actually the multiple frames required to transmit the partitioned bits. This is clearly expressed on page 6, lines 26-27. There it states that: " . . . the multi-frame signaling bits are changed to represent Mode 2. For frames 6 to 8, Mode 2 is used as the coding mode." This is also supported by the statement on page 5, line 24 where it states that "the multi-frame signaling bits 102 transmitted in three consecutive frames . . ." Thus the multi-frame, in the context of claim 20, is defined by the number of sections into which the control information is partitioned. This is the correspondence required by the claim. This correspondence is clearly supported by the specification.

Referring to page 4, line 23, there is described an embodiment in which a multi-frame of six frames is described. There it states that three frames of the multi-frame of six frames are required to transmit the partitioned three bit coding mode information. This does not negate support for a claim that requires the number of sections into which the coding mode is partitioned to correspond with the number of frames in the multi-frame. First of all, the claim require correspondence,

not one to one correspondence. The definition of the term correspondence is not so narrow, and merely requires agreement. Thus, correspondence between the number of frames and the number of sections merely requires that there be sufficient frames in the multi-frame to accommodate the sections into which the partitioned control information is paused.

Even if the Examiner refuses to accept the fact that correspondence should not be read as narrowly as the Examiner submits, there is no reason to read the six-frame multi-frame described on page 4 as a lack of support for a claim directed to a method in which the number of frames in the multi-frame sequence is defined by the number of sections into which the coding mode is partitioned. True, a six-frame sequence is a multi-frame sequence. A three-frame sequence is also a multi-frame sequence. Clearly, the example described on page 4 is a multi-frame of six frames that contains a three-frame multi-frame sequence. That three-frame sequence transmits the partitioned coding mode.

It is for the foregoing reasons that the Examiner is requested to withdraw his rejection of claim 20 under 35 USC § 112.

The Examiner's rejection of claims 29 and 32-34 should be withdrawn for the same, above-described reasons. Again, the Examiner objects to the phrase "the number of sections corresponding to the number of frames in the multi-frame" as not being supported by the specification. Nothing in the specification requires one-to-one correspondence between the number of frames and the number of sections. Even if the Examiner chooses to use an overly narrow definition of the word correspondence, the multi-frame of six frames described on page 4, line 23 clearly consists of one three frame sequence having the partitioned coding mode distributed such that there is one

bit of the coding mode in each of the three frames along with other frames.

The Examiner rejects claim 37 under 35 USC § 112. The Examiner correctly observes that the communication from the second device to the first device is the uplink. Claim 37 is amended to recite that the uplink is established between the second device and the first device.

The applicants are confused about the Examiner's rejection of claim 38. That claim seems to correctly identify the downlink from the first device (the fixed part with the transmitter) to the second device (the mobile part with the receiver). Indeed this language is consistent with the Examiner's expressed understanding of a GSM system (where the downlink goes from the fixed part to the moving part). Since the Examiner is apparently of the view that the fixed part is the first device and the mobile part is the second device, the applicants do not understand the basis for the Examiner's conclusion. Indeed the Examiner's objection seems to contradict the Examiner's observation that the fixed part (the first device) contains the transmitter and the mobile part (the second device) contains the receiver in the downlink. The applicants believe that the relationship between the first device and the second device is correctly set forth in claim 37. It is for this reason that the Examiner is respectfully requested to withdraw his rejection of claim 38.

The Examiner rejects claims 20-22, 25, 29 and 32-34 under 35 USC § 102(b). The Examiner cites US Patent No. 6,418,558 to Roberts et al. (Roberts et al. hereinafter) as the basis for his rejection.

Briefly and by way of review, applicants' invention is directed to the signaling of information in a transmission system. The invention is described in the context of, and is applied to, a mobile communications system. In a mobile

communications system there is a downlink, defined from a network (fixed part) to a mobile, and an uplink defined from the mobile to the network (fixed part). See page 5, lines 20-22 of applicants' specification.

Certain embodiments of the present invention relate to the transmission of signaling information in the downlink and uplink of a mobile communication system. These embodiments are best described with reference to Fig. 2 and the accompanying text at page 6, lines 9 to 16.

The information in column 2 is the three bit "actual mode signaling codeword for downlink." This is the actual codeword transmitted in a frame of the downlink that represents the coding applied to the data in that frame. This is also an example of the first type of control information required by the claim.

The information in column 3 is the multi-frame signaling bit used for characterizing the coding mode command for the uplink sent in the downlink. Page 6, lines 11-12. These are the multi-frame bits that are sent in the downlink to the mobile, and then used by the mobile as the coding mode commands for an uplink transmission (i.e. transmissions from the mobile).

Thus, the multi-frame bits transmitted in the downlink represent the actual coding mode to be used in the uplink. Frame section 3 for the frames 0-2 contain the mode command bits in the downlink that are reformed and used to characterize the coding mode for the uplink.

As noted on page 8, lines 1-19 of applicants' specification, the partitioned bits are derived from a second

type of control information. These bits are generated according to the coding mode for the next frames. This is an example of the second type of control information required by the claims.

The information in column 4 is the three bit actual mode codeword used for signaling of the coding mode for the uplink. Page 6, lines 13-14. This is the actual codeword transmitted in a frame of the uplink, and it represents the coding applied to the data in that frame.

The information in column 5 is the multi-frame signaling bit of the uplink used for characterizing the transmission quality of the downlink as received and measured by the mobile part. Page 6, lines 14-15. These are the multi-frame bits that are sent in the uplink to the network, representing the transmission quality of the downlink.

In both the uplink and the downlink transmissions, the actual codeword included in each frame represents the coding used in that frame. The multi-frame signaling bits (that is the multiple signaling bits that are partitioned and distributed in the frame sections of multiple frames) represent different information in the downlink and the uplink.

In the downlink, the multi-frame signaling bits are transmitted from the network (fixed part). They comprise the coding mode which the network has determined the mobile is to use. The network determines the actual coding modes for use in both the uplink and the downlink (p. 6, lns. 28-29). These multi-frame bits are received on the downlink by the mobile, and used by the mobile to code the uplink transmissions. In a 'symmetrical' mode of operation the codes used by the mobile are the same as those used by the network, and therefore the mobile could simply use the actual code modes in the frames received in

the downlink from the network. Where symmetrical operation occurs, the multi-frame signaling bits introduce a layer of 'protection', with the retrieved multi-frame bits being compared to the actual code modes contained in the downlink frames.

In the uplink, the multi-frame signaling bits are transmitted in the uplink from the mobile. They comprise a representation of the quality of the downlink as measured by the mobile. The bits forming the quality measurement are received from the uplink by the network. See the description at page 5, lines 25 to 27; page 7, lines 1 to 3.

The user data is coded using one mode of available modes according to the selected coding modes (p. 4, lns. 17-19; p. 5, lns. 4-6). As in the preferred example, six different coding modes are supported. Three bit code words can be used to represent the coding modes (p. 4, lns. 19-20). The selected coding mode is used to channel code data which is already speech coded. At least one additional bit, a portion of the multi-frame signaling information, is also encoded in this frame with the speech. This additional bit is part of a three-bit information word representing additional signaling information (p. 4, lns. 25-26).

The three bit information for the additional signaling information may represent the already described six different coding modes available, or measurement information (p. 4, lns. 27-28). The three bits of the additional signaling information are transmitted one bit at a time in three frames (p. 4, lns. 28-30). ("In this example it takes three frames within a multi-frame of six frames . . . to transmit the coding mode information as within each frame only one of three bits is transmitted, thus providing additional protection for the coding mode information.")

In the uplink, the respective frames similarly include the actual coding mode used for the respective frame, as coded by the mobile (p.5, lns. 22-24). In addition multi-frame bits are transmitted in three consecutive frames in the preferred embodiment (p. 5, lns. 24-25), as in the downlink. However, the three multi-frame bits represent a quality measurement for the downlink as measured by the mobile (p. 5, lns. 25-27). The three bits allow eight different levels to be represented.

In decoding frames at both the mobile and the network, the codeword used is that transmitted in the frame to be decoded in the respective downlink and uplink (p. 7 lns. 4-9). In symmetrical operation (as illustrated in the above figure), the fact that the uplink and downlink use the same actual code modes ( $x = y$ ) can be used to introduce a high level of protection. The code word in the received frame at either end of the link should match the code word being used to generate frames at that end of the link (p. 7, lns. 12-20).

The primary distinction between applicants' invention and Roberts et al. is that Roberts et al. does not, as the Examiner contends, describe the use of a first and second type of control information where the second type of control information is partitioned into the number of frames in a multi-frame.

Even a cursory reading of Roberts reveals that it does not convey a concept of partitioning a second type of control information corresponding to the number of frames in the multi-frame.

The discussion of the ninth signaling bit at column 30, lines 42-50 is illustrative. There it describes the use of the ninth signaling bit. It is designed to carry the signaling



bits to channel units. However, there is no discussion of partitioning signaling bits. In fact, the ninth bit is described as carrying a pattern which is updated each frame. This would seem to teach away from the concept of partitioning a control word for future frames (the second type of control information) and distributing each section among the frames of a multi-frame sequence.

Because Roberts fails to disclose a method in which a second type of control information is 1) partitioned and 2) transmitted with each frame of a multi-frame, Roberts et al. fails to anticipate applicants' claim 20. Because rejected claims 21, 22 and 25 depend from rejected claim 20, they are not anticipated by Roberts et al. for the same reason. Although Roberts et al. does describe individual signaling bits, Roberts et al. does not disclose or suggest partitioning a second type of control information (e.g. a codeword) and distributing that partitioned control information among frames in a multi-frame sequence. The Examiner is respectfully requested to withdraw his rejection of claims 20-22 and 25, in view of Roberts et al.

The Examiner rejected claim 29 and the claims dependent thereon under 35 USC § 102(b) based on Roberts et al. Claim 29 states that each frame of the multi-frame is associated with a first type of control information and transmits, along with the first type of control information, a section of the partitioned second type of control information. The claims further require receiving the frames and reforming the sections into the second type of control information. Such a method is not taught by Roberts et al. Specifically, Roberts et al. does not disclose or suggest partitioning the second type of control information among sections in multi-frames and *reforming* those sections into the second type of control information. It is

abundantly clear from the cited portion of Roberts et al. (col. 98, ln. 62 to col. 100, ln. 21) that the ninth bit is not a partitioned sequence which is reformed into a second type of control information. The command described in column 99, line 40 to column 100, line 21 may be formed, but it is most certainly not reformed.

It is for this reason that claim 29 is not anticipated by Roberts et al. The Examiner is respectfully requested to withdraw his rejection of claim 29.

Claims 32, 33 and 34 are not anticipated by Roberts et al. for the same reasons that claims 20 and 29 are patentable. With regard to claim 32, as noted above, Roberts et al. does not describe a device that partitions a second type of control information and transmits a portion of that partitioned information along with a first type of control information. With regard to claims 33 and 34, as noted above, Roberts et al. does not describe *reforming* the second type of control information. As such, Roberts et al. does not disclose or suggest a communication device having a means for *reforming* the control information. It is for this reason that claims 33 and 34 are not anticipated by Roberts et al.

The Examiner rejected claims 23 and 24 as obvious under 35 USC § 103(a). The Examiner cited Roberts et al. in view of US Patent No. 6,134,220 to Le Strat et al. (Le Strat hereinafter) as the basis for the rejection.

At the outset, applicants observe that claims 23 and 24 depend from claim 20. Claim 20 is patentable over Roberts et al. for the reasons previously described. As previously noted, Roberts et al. fails to disclose a second type of control information (i.e. as defined by applicants a second type of

control information is information not related to the current frame; See page 9, lines 15-20 of applicants' specification). Clearly, in Roberts et al., the signaling bit is related to the current frame and is not partitioned into a number of sections corresponding to the number of frames in the multi-frame. In Roberts et al. there is simply no concept of taking control information and partitioning that information. In Roberts et al., the individual signaling bits have meaning. It is the individual bits that convey information in the frame in which they are placed, not a codeword assembled from the individual bits that is used in later frames.

In his obviousness rejection of claim 23, the Examiner states that it would be obvious to combine the teaching of Roberts et al. and Le Strat et al. Claim 23 requires that the second type of control information (not the individual bits, but the coding mode represented by the unpartitioned bits) be transmitted in the downlink and used in the uplink. As noted above, Roberts et al. does not describe partitioning a discrete bit of information for transmission, and reassembling that information to provide control information in another link of the transmission. Although Le Strat does teach sending a coding mode through the FACCH, Le Strat does not teach transmitting the coding mode in the downlink in a partitioned manner and using that partitioned coding word (reformed) as a code word in the uplink.

Claim 24 is not obvious for identical reasons. That claim requires that the transmission is an uplink (i.e. from mobile to fixed part) and that the first type of control information represents a coding mode in the uplink and the second type of control information represents a downlink quality measured in the downlink (the mobile part). See page 8, lines

25-30. Roberts et al. does not teach partitioning a second type of control information among multi-frames in one link of a transmission system wherein the second type of control information is quality measured in the downlink. As noted above, Le Strat does not disclose or suggest transmitting two types of control information, one partitioned and one not, wherein the partitioned information is allocated among multiple frames in a multi-frame.

The Examiner notes that Le Strat teaches that the coding mode *depends* on the quality of the transmission required and the resources required. However, selecting a coding mode with these considerations is completely different from communicating a coding mode or other control information in partitioned form and distributed among multiple frames, wherein the control information is reformed and used by another link in the system. Nothing in Roberts et al. suggests the modification to Le Strat that the Examiner contends is obvious. Where in Roberts et al. is the suggestion that Le Strat partition a second type of control information and distribute the partitioned portions among multiple frames? Merely because Le Strat recognizes that coding modes are selected based on quality does not mean that Le Strat suggests transmitting the quality information in partitioned form in the downlink for use in the uplink.

The Examiner rejects claims 26-28 as obvious under USC § 103(a). The Examiner cites Roberts et al. in view of US Patent No. 5,199,031 to Dahlin (Dahlin hereinafter) as the basis for this rejection.

Claims 26-28 depend from claim 20. Claim 20 is patentable over Roberts et al. for the reasons stated above.

Claims 26-28 are patentable by virtue of their dependence from Claim 20.

The Examiner contends that Dahlin suggests partitioning control information to allow for error detection and correction. While Dahlin does describe data manipulation, the manipulation described can hardly be characterized as partitioning the information among multiple frames for use as control information in another link of the system. As noted above Roberts et al. does not describe partitioning a second type of control information and using that second type of control information in another link. Roberts et al. merely describes the use of individual bits, with no suggestion that the individual bits, in the aggregate, are a second type of control information.

It is for the foregoing reason that Roberts et al. in view of Dahlin does not render obvious claim 25-28. The Examiner is respectfully requested to withdraw his rejection of these claims.

The Examiner rejects claims 30, 31, 35 and 36 under 35 USC § 103(a). The Examiner cites Roberts et al. in view of US Patent No. 5,881,105 to Balachandran et al. (Balachandran et al hereinafter) in view of Le Strat et al.

As noted above, claim 29, upon which claims 30 and 31 depend, is patentable over Roberts et al for reasons previously described. Thus claims 30 and 31 are patentable at least by virtue of their dependence from claim 29.

With regard to claim 30, that claim requires that the received frames (in the downlink) be decoded using a mode code derived from the first type of control information for each

frame. Although Balachandran et al. describes decoding received frames and La Strat describes the use of different coding modes for different circumstances, neither reference describes the transmission of the mode code (for decoding the received frames; i.e. the first type of control information) along with a bit of the partitioned second type of control information. As previously noted above, Roberts et al. does not disclose or suggest partitioning a second type of control information and parsing that partitioned information among the frames of a multi-frame sequence. Thus Roberts et al. does not inform the teachings of Balanchandran et al. and Le Strat in a manner that would suggest partitioning a second type of control information and transmitting only a portion of the partitioned information along with the first type of control information in each frame.

With regard to claim 31, that claim requires the use of the reformed second type of coding information to encode frames for transmission. None of the cited references described the use of *reformed* coding information (reformed from partitioned coding information distributed among several frames) to encode frames for transmission. It is for this reason that claim 31 is not obvious in view of the cited references.

With regard to claim 35, that claim depends from claim 34 (claim 34 is patentable over Roberts et al. for the reasons stated above) and specifies that the second device is adapted to decode frames in response to the first type of control information contained in a received frame. While the cited references may describe communication systems with a second device adapted to decode frames, the cited references do not describe a communication system in which the first type of control information is transmitted with a portion of partitioned

second type of control information. As such, claim 35 is not obvious in view of the cited references.

With regard to claim 36, that claim also depends (indirectly) on claim 34. Claim 36 requires the second device to have an encoding means for encoding data transmission using a mode code based on the reformed (reformed from the partitioned information) second type of control information. As noted above, none of the cited references describe the use of reformed control information. Certainly none of the references describe the use of reformed control information to encode data for transmission. Although the cited references (Le Strat et al. in particular) teach the use of coding modes to encode data, the references, either alone or combined, do not teach the transmission of a first type of control information along with a portion of partitioned second type of control information.

Based upon the foregoing, it is submitted that new claims 20-38 are patentable over Roberts et al. either alone or in combination with Le Strat, Dahlin, Balanchandran or some combination thereof.

As it is believed that all of the rejections set forth in the Official Action have been fully met, favorable reconsideration and allowance are earnestly solicited.

If, however, for any reason the Examiner does not believe that such action can be taken at this time, it is respectfully requested that he telephone applicants' attorney at (908) 654-5000 in order to overcome any additional objections which he might have.

If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge

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